

Innovative Ultra-High Efficiency Cryogenic Actuators for Rocket Test Facilities, Phase I

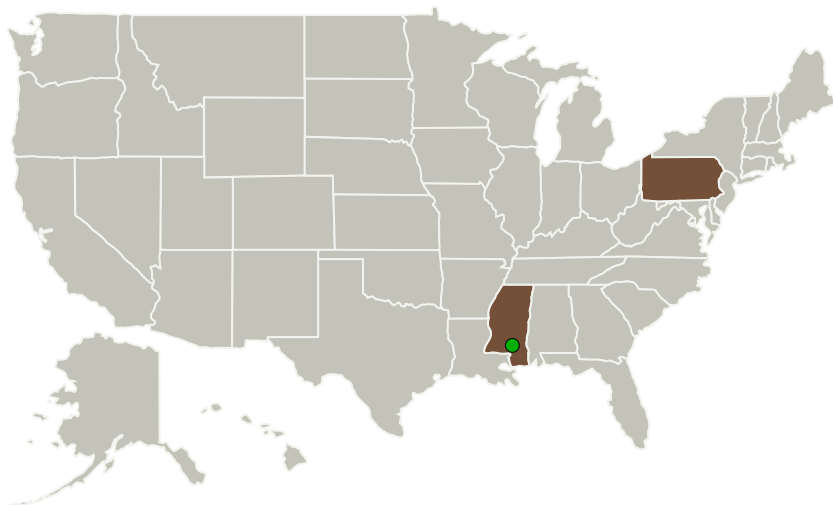
Completed Technology Project (2017 - 2017)



Project Introduction

The SBIR Phase I project will develop advanced ultra-high efficiency cryogenic actuators for NASA cryogenic fluid transfer application. The actuator will have low driving voltage, large stroke, high driving force, low profile and light weight, low thermal mass, broad operation temperature down to cryogenic temperature, and high reliability. The excellent performance is achieved by using a patented technology that combines (1) d33 mode piezoelectric operation that is at least 100% stronger than d31 mode, (2) piezoelectric single crystal with high piezoelectric response at cryogenic temperature, (3) multilayer design to reduce driving voltage, (4) force amplified design to increase stroke and reliability, and (5) multi stack design to reduce the mechanical impedance. The Phase I will develop demo device for the NASA application.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
PolyK Technologies, LLC	Lead Organization	Industry	State College, Pennsylvania
● Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi



Innovative Ultra-High Efficiency Cryogenic Actuators for Rocket Test Facilities, Phase I Briefing Chart Image

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Primary U.S. Work Locations

Mississippi

Pennsylvania

Images



Briefing Chart Image

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(<https://techport.nasa.gov/image/130681>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

PolyK Technologies, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

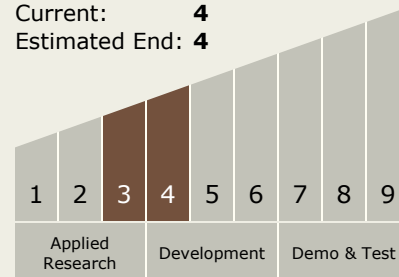
Carlos Torrez

Principal Investigator:

Shihai Zhang

Technology Maturity (TRL)

Start: 3
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.2 Electric Space Propulsion
 - └ TX01.2.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System